

## Claims

What is claimed is:

- 5           1. A method of operating a snowmobile engine having an air charging assembly,  
an engine air intake assembly, the method comprising the steps of:  
          compressing intake air in the air charging assembly;  
          providing a snow/ice retention area adjacent to a heat exchanger;  
          causing snow/ice to be propelled into the snow/ice retention area;  
10          passing ram air through the heat exchanger and the snow/ice;  
          passing the compressed intake air through the heat exchanger to thereby transfer  
heat to the snow/ice; and  
          directing the compressed intake air into the air intake assembly.
- 15          2. The method of claim 1 further including the steps of: melting the snow/ice into  
liquid water; and blocking a portion of the heat exchanger to prevent flow of the liquid  
water out of the heat exchanger, thereby causing the liquid water to vaporize.
- 20          3. A method of operating a snowmobile engine having an air charging assembly  
and an air intake assembly, the method comprising the steps of:  
          compressing intake air in the air charging assembly;  
          locating snow/ice on a first heat exchanger by providing a snow/ice retention area  
adjacent to the heat exchanger, and causing snow/ice to be propelled into the snow/ice  
retention area;  
25          passing an intercooler liquid through the first heat exchanger to thereby transfer  
heat to the snow/ice;  
          passing the intercooler liquid through a second heat exchanger;  
          passing the compressed intake air through the second heat exchanger to thereby  
transfer heat to the intercooler liquid;  
30          directing the compressed intake air into the air intake assembly;

monitoring operating conditions of the engine; and  
injecting the intercooler liquid into the air intake assembly under a predetermined set of the operating conditions.

5           4. The method of claim 3 further including the step of passing ram air through the heat exchanger and the snow/ice.

5. The method of claim 3 wherein the step of monitoring the operating conditions of the engine includes the steps of: monitoring the amount of intercooler liquid,  
10   measuring the temperature of the compressed intake air in the air intake assembly, and detecting if an engine knock is occurring in the engine.

6. A snowmobile comprising:  
a chassis that includes a track tunnel portion having a front end, with the front  
15   end of the tunnel portion including an intercooler opening, and a wall located adjacent to the front end of the track tunnel and the intercooler opening defining a snow/ice retention area;  
a track located within the tunnel portion;  
an engine mounted to the chassis, and including an air intake assembly and an  
20   exhaust assembly;  
an air charging system;  
an intercooler system including a heat exchanger being disposed adjacent to the intercooler opening and the wall, with the heat exchanger including a charge air inlet and a charge air outlet, and with the charge air inlet being in fluid communication with the  
25   air charging system and the charge air outlet being in fluid communication with the air intake assembly; and  
a screen covering the intercooler opening.

7. The snowmobile of claim 6 wherein the air charging system includes a turbocharger, with the turbocharger having a turbine in fluid communication with the exhaust assembly and a compressor adapted to be in fluid communication with intake  
5 air.

8. The snowmobile of claim 6 wherein the heat exchanger has a lower portion, and wherein the heat exchanger further includes a flap sealingly mounted to the lower portion.  
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9. The snowmobile of claim 6 further including a ram air duct having a first end adapted to be open to air around the snowmobile and a second end adjacent to the heat exchanger.